

Soft X-ray performance of high-resolution superconducting spectrometers

C. A. Mears, M. Frank, S. E. Labov, L. J. Hiller, D. Chow, M. A. Lindeman,
J. B. LeGrand H. Netel and A. T. Barfknecht*

Lawrence Livermore National Laboratory, Livermore, CA 94551

*Conductus, Inc. Sunnyvale, CA 94086

Abstract

We are developing high-resolution, broad-band, superconducting X-ray spectrometers for applications in materials science, astrophysics and biophysics. These spectrometers are superconducting microcalorimeters based on superconducting tunnel junction sensors made from thin films of niobium and aluminum. The energy resolution of these spectrometers can be more than an order of magnitude better than that of the best Si(Li) or Ge(Li) detectors. We will present results of recent measurements characterizing the performance of these detectors for X-ray energies from 70 eV to 1000 eV, where the energy resolution ranged from 4 eV (at 70 eV) to 14 eV (at 1000 eV). We will discuss our plans to increase the active area of these detectors by using arrays or novel superconducting amplifiers.

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